

**MACKAY FISH HATCHERY  
ANNUAL REPORT**

**INTRODUCTION**

The Mackay Hatchery operates under "specialty" status, producing salmonids of various species and strains from 1 to 14 inches in length for statewide distribution. Production for the year exceeded 3.84 million fish, with a net poundage of 122,000 pounds (Table 1).

Cost of fish produced averaged \$1.265 per pound and \$.0401 per fish (Table 2).

Included in the year's production were 7 species and 18 different strains as follows:

Rainbow Trout

- Tensleep (Wy)
- Shepherd of the Hills (Mo)
- Eagle Lake (Ca)
- Lake McConaughy (Ne)
- Arlee (Mt)
- Mt. Shasta (Ca)
- Pennask River (BC)
- Duncan River Kamloops

Cutthroat Trout

- Henry's Lake
- Westslope

Rainbow - Cutthroat Hybrids

- Henry's Lake Cutthroat x Kamloop Hybrids
- Henry's Lake Cutthroat x Eagle Lake Rainbow Hybrids
- Henry's Lake Cutthroat x Lake McConaughy Rainbow Hybrids

Coho Salmon

Fall Chinook Salmon

Kokanee Salmon

- Early (Deadwood) Kokanee
- October (Paulina Lake, Or.) Kokanee

Grayling

Table 1. Fish production at Mackay Hatchery, October 1, 1988 to September 30, 1989.

Species & strain	Lot number	Source	Received as	Number/pounds received or carried over(*)	Yield (number/pounds)	Destination & comments
Rainbow R1, Tensleep & of the Hills	7-U-Ut	Egan SFH, Utah	eyed eggs	11,700/5,401*	11,700/8,700	Mackay Reservoir, Fall Stocking (88)
Rainbow R5 Mt. Shasta	8-En-R5	Ennis NFH, Mt.	eyed eggs	106,050/9,446*	110,430/53,799	Region 6 Catchables
Rainbow R6 McConaughy	8-En-R6	Ennis NFH, Mt.	eyed eggs	44,275/1,942*	44,000/2,400	Mackay Reservoir, Fall Stocking (88)
Rainbow R7 Eagle Lake	8-Ct-R7	Creston NFH, Mt.	eyed eggs	50,600/2,134*	50,200/3,100	Mackay Reservoir, Fall Stocking (88)
Kamloop K2 Dunkin River	8-En-K2	Ennis NFH, Mt.	eyed eggs	44,175/1,840*	44,000/2,750	Mackay Reservoir, Fall Stocking (88)
Grayling	8-U-Id-07	Ashton SFH,	fry	2,250/5*	2,000/6	wildhorse Creek (88)
Cutthroat C2	8-U-Id-16	McCall SFH,	fry	42,000/77*	39,200/2,800	Payette Lake (89)
Rainbow RP Pennask River	8-F-Can	Summerland Trout Hatchery, B.C.	fry	14,888/30*	13,800/775	Little Payette Lake
Rainbow R5 Mt. Shasta	9-En-R5	Ennis NFH, Mt.	eyed eggs	207,13	126,500/12,777	Region 6 Catchables (90)
Rainbow RA Arlee	9-En-RA	Ennis NFH, Mt.	eyed eggs	165,000	99,000/2,200	Mackay Reservoir, Stocking (89)
Rainbow RP Pennask River	9-F-Can	Summerland Trout Hatchery, B.C.	eyed eggs	24,000	19,500/33	Little Payette Lake(90)
Coho Salmon Columbia River	9-U-Or	Sandy SFH, Or.	eyed eggs	490,000	436,650/13,050	Cascade & Island Park Reservoirs (89)
Kokanee KE Deadwood Res.	8-U-Id-09	Eagle SFH, Id.	eyed eggs	935,73	662,970/11,430	Regions 1,2,3,5,6. (89)
Kokanee KO Paulina Lake, Oregon	8-U-Or	Paulina L. Or.	green eggs	558,10	204,000/3,000	Salmon Falls Reservoir (89)
Fall Chinook Wolf Lodge	8-U-Id-46	Cabinet Gorge SFH	eyed	73,131	57,620/2,300	Coeur d'Alene, Mormon, Salmon Falls Res.
Cutthroat C3 Henrys Lake	9-U-Id-C3	Henrys Lake SFH	eyed eggs		1,060,410/10,410	Henrys Lake & Mountain Lakes (89)
Cutthroat C2 Westslope	9-U-Id-16	McCall SFH, Id.	fry	85,000/120	84,500/192	Mountain Lakes (89) Payette Lake (90)
RB X C3 Hybrids (C3 X R6)	9-RC-HOR	Henrys Lake SFH	eyed eggs	134,470	89,880/1,236	Hormone-sterilized, Regions 3,6 (89)
RB X C3 Hybrids (C3 X K2,R6,R7)	9-U-Id-RC	Henrys Lake	eyed eggs	1,277,462	898,053/11,662	Regions 2,3,5,6 (89)
Kokanee KE	9-U-Id-20	Eagle SFH, Id.	eyed eggs	413,669	850,000	eggs--not hatched at end year.
Grayling	9-U-Id-07	Ashton SFH, Id.	fry	'6,000/4	15,500/11	High Mountain Lakes, Wildhorse Creek (89)

Table 2. Survival and cost of fish reared at Mackay Hatchery. October 1, 1988 to September 30, 1989.

Size, species, and strain	Percent survival from beginning of fish year _to stocking_	Percent survival from egg to stocking	Cost	Cost/ fish	Comments
14-inch Tensleep & Shep Hills rainbow	100		\$4,050	\$0.346	Stocked in November 88
14-inch Mt. Shasta rainbow	99		54,641	0.495	Summer 89 catchables
6-inch Lake McConaughy rainbow	99.3		564	0.013	Stocked in November 88
6-inch Eagle Lake rainbow	99.2		1,190	0.023	Stocked in November 88
6-inch Dunkin River Kamloop	99.6		1,121	0.025	Stocked in November 88
2-inch grayling	88.9		201	0.101	
6-inch westslope cutthroat	93.3		3,355	0.086	
5-inch Pennask River rainbow	92.7		918	0.066	
2-inch Pennask River rainbow		81.3	41	0.002	on hand
6-inch Mt. Shasta rainbow		61.1	15,741	0.124	on hand
4-inch Arlee rainbow		60.0	2,710	0.027	
4- to 6-inch coho salmon		89.1	15,322	0.035	
3-inch early kokanee salmon		70.9	14,081	0.021	
3-inch October kokanee salmon		36.6	3,696	0.018	Received as green eggs
5-inch fall chinook salmon		78.8	2,834	0.049	
1- and 3-inch Henrys Lake cutthroat		65.4	13,824	0.013	Includes helicopter costs
1- to 2-inch westslope cutthroat	99.4		3,689	0.043	Included helicopter costs
3- to 4.5-inch sterile rainbow hybrids		66.8	2,022	0.022	Includes sterilization
3- to 4.5-inch normal rainbow cutthroat hybrids		70.3	14,317	0.016	

## **HATCHERY IMPROVEMENTS**

1. Two new fiberglass troughs, each 15 ft x 2 ft x 2 ft deep, were added to the battery of rearing troughs.
2. The bay doors on the garage at Residence 2 were removed, the front of the garage was rebuilt, and a modern, swing-up bay door was installed.
3. The exteriors of Residences 2 and 3, and the garage at Residence 2 were painted.
4. A migration barrier was fabricated and installed between the hatchery settling pond and Warm Springs Creek to keep migrating fish away from the hatchery.
5. A turn-around area was constructed near the large raceways to enable the large fish transports to turn around.
6. The old bypass ditch from the spring area was encased in a culvert and buried. The ground above and around the culvert was landscaped and planted to grass.
7. The incubator lines in the hatchery building were replaced with PVC lines.

## **FISH HEALTH**

No infectious diseases were experienced in Mackay production fish this year.

Bacteria were found in the gills of a few fall chinook fry that had failed to take first feed, as one would expect.

What was described as "VEN-like inclusions" were found in two year classes of Mt. Shasta rainbow. This is apparently more of a scientific curiosity than a disease problem.

A summary of disease inspections is included in Table 3.

## **PUBLIC RELATIONS**

Approximately 700 people toured the hatchery during the year. Due to its remote location and unfavorable climate, few people actually seek out the hatchery. Most are hunters and fishermen who happen here incidental to other activities.

Table 3. Fish health inspections at Mackay Fish Hatchery, October 1, 1988 to September 30, 1989.

Sample date	Species/strain	Lot number	Lab Tag number	VH	VP	VE	BK	BR	BF	PW	PX	PC	Comment
1/11/89	Fall Chinook/Wolflodge	9-U-Id-46	89-04	-	-	-	x	-	-		x	x	BGD+
3/29/89	Fall salmon/Columbia R.	9-U-Or	89-48	-	-	-	-	-	-		x	x	
3/30/89	Fall Chinook/Wolflodge	9-U-Id-46	89-49	-	-	-	-	-	-	-	x	x	
7/5/89	Rainbow trout/Mt. Shasta	8-En-R5	89-113	-	-	-	-	-	-	-	x	x	See not
7/5/89	Rainbow trout/Mt. Shasta	9-En-R5	89-114	-	-	-	-	-	-	x	-	x	See not

NOTE-VEN-like inclusions

+ = Positive Results

- = Negative Results

x = Testing/sampling Not Feasible

VH = IHNV, infectious hematopoietic necrosis virus

VP = IPNV, Infectious pancreatic necrosis virus

VE = EIBS, erythrocytic inclusion body syndrome

BK = bacterial kidney disease agent, Renibacterium salmoninarum.

BR = enteric redmouth bacterium, Yersinia ruckeri

BF = bacterial fununculosis, Aeromonas salmonicida.

PW -whirling disease agent, Myxobolus (Myxosoma) cerebralis

PX = PKX, agent of PKD, proliferative kidney disease.

PC = Ceratomyxa Shasta, agent of ceratomyxosis.

Hatchery tours were given to school groups. Slide presentations were made for the local Chamber of Commerce.

## **SPECIAL PROJECTS**

### **Sterile Hybrid Program**

A request was received from Regions 3 and 6 for 89,000 sterile rainbow x cutthroat hybrids this year.

The Henrys Lake Hatchery crossed approximately 160,000 Henrys Lake cutthroat eggs with Lake McConaughy rainbow sperm from the Ennis NFH for this project. During incubation, the eggs were immersed in a 0.40 mg/l solution of 17-alpha methyl testosterone for two hours at 63% and at 78% of hatch, as measured by temperature units. After eyeing, 134,000 of these eggs were shipped to the Mackay Hatchery. At the Mackay Hatchery, the resultant fry were given an identical treatment with the steroid at 102%, and 116% of hatch. As the fish began to feed, Rangen soft-moist feed was top-dressed with the methyl testosterone in a fish oil carrier to provide 10 mg of steroid per kg of feed and fed for 90 days at a hatchery constant of 6.

These sterile fish were destined for Henrys Lake, Warm Lake, Little Payette Lake, and the following high mountain lakes in Region 3: Louie Lake, North Fork 20-mile Lake #1, Lake Rock Lake, Tule Lake, and Idler Creek Lake #2. The high lakes were planted by the McCall Hatchery. The fish for Henrys Lake received an RV fin clip. The others were not marked.

Three hundred and fifty of the sterile fish were held at the Mackay Hatchery for histological inspection of the gonads during the next two years for an assessment of the efficiency of the sterilizing procedure.

### **October Kokanee**

For the first time this year, October-spawning kokanee were raised for introduction into Salmon Falls Reservoir. With the generous assistance of the Oregon Department of Fish and Wildlife, adult kokanee were spawned at Paulina Lake, near Bend, Oregon, and the green eggs were transported to the Mackay Hatchery, where they were incubated, hatched, and reared.

Rearing success was poor, with only 37% surviving to stocking (see Table 2). This can be partly explained by considering that there was a 14-hour transport of the green eggs. However, eye-up was 67%. After eye-up, the eyed eggs hatched prematurely and died continually until hatch. After hatching, mortality was negligible. NOTE--as of this writing (December 1989), the next brood year of the October kokanee is showing a similar mortality pattern in incubation.